

OBSERVATIONS ON THE STRUCTURE OF THE ORACER-
ATUBAE AND SOME NEW LEPIDOSAPHINE
SCALES (HEMIPTERA)*

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An oraceratuba is the opening of a ceratuba to the exterior. So far as I have been able to ascertain an oraceratuba is regarded as an opening having a diameter approximating the diameter of the ceratuba. The attached end of the ceratuba is usually heavily chitinized in the altaceratubæ, though in the brevaceratubæ an excess of chitinization is seldom present. Attached to the edge of the ceratuba and stretched across the end is a thin membrane with a slit in the center, which may be opened or closed to allow the wax to be extruded or retained in the ceratuba. This opening in the membrane which closes the ceratuba is the oraceratuba. The edge of the membrane around the oraceratuba is slightly chitinized. Figure 1 is an altaceratuba of *Lepidosophes pinnaeformis* with the oraceratuba open. Figure 8 is a large brevaceratuba of *Scobinaspis dentata*, with the oraceratuba closed.

The ceratubæ of the tribes Parlatoriini, Diaspidini and Aspidiotini are closed in the same fashion as those of the Lepidosaphini. It is very probable that the ceratubæ of the Fioriniini and the Leucaspidini are closed by a similar membrane.

The presence of a membrane which closes the attached end of the ceratubæ—hitherto regarded as open—and the presence in the membrane of an aperture which may be opened and closed seems to confirm MacGillivray's suggestion in *The Coccidæ* that the ceratubæ function as reservoirs for the storage of the wax secreted by the wax-cell which is attached to the end of the bulla, and which is formed into threads as it passes through the aperture.

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As all Lepidosaphine scales are usually thought of and described as having plates simple or rarely furcate it is interesting to find two species, *Lepidosaphes camelliæ* and *Mytiella sexspina*, with plates which are distinctly pectinate. The plates of the median incisura are pectinate on both the lateral and the mesal edge about midway between the proximal and the distal end. More or less variation is found in the number of the projections on each side and some variation in the length of the projections. Usually the greatest number of projections in *sexspina* are on the lateral edge while on the mesal edge frequently only one pectination is evident (Fig. 12c). The lamaceratubæ are long and slender. Those opening in the plates of the median and second incisuræ are approximately the same length, while those of the plates of the third incisuræ are slightly longer. The entire plate with its lamaceratuba is illustrated in Figure 12c. Only the proximal portions of the lamaceratuba are shown in Figure 12a and 12b. The pectinate projections of the mesal plates of each second (Fig. 12b) and third incisura (Fig. 12a) are always on the lateral margin of the plate. There are usually three or more distinct dentate projections on the mesal plate of each of the third incisura. The plates of *camelliæ* are of the same general type as in *sexspina*, but the mesal edge of the plates of the median incisura usually has the greatest number of projections, while on the lateral edge frequently only one pectination is evident. (Fig. 4).

The first preabdominal segment of *dentata* bears a number of small plates or bracteæ on each lateral aspect (Fig. 6). These bracteæ vary in shape and a paraceratuba opens at its distal end. These bracteæ with their paraceratubæ are greatly enlarged in Figure 9, which also shows a ceratuba which is usually found associated with the plates, but which opens flush with the surface of the cuticle instead of through a bractea.

The lateral aspects of the preabdominal segment of *sexspina* bear a number of ceratubæ varying in size. These are shown in Figure 11. Ceratubæ of still smaller size are located on the ventral aspect of the cephalic portion of the head of *Scobinaspis dentata* (Fig. 7). The antennæ, setæ and the tooth-like projections on the ventral aspect of the head are also shown in Figure 7.

The scales described at this time were collected in Mississippi, from the central part of the state to the gulf coast. Each

species is found in both sections and it is very probable that they are generally distributed throughout the state. *Mytiella sexspina* also occurs in Florida.

Lepidosaphes camelliæ n. sp. (Figs. 2, 3 and 4).

Scale of Female.—Color pale brown, broadest at posterior end, at broadest portion usually three-eighths as broad as long, straight or curved, usually straight when not crowded; ventral scale white, median portion usually adhering to host-plant.

Scale of Male.—Similar to that of female, though smaller and darker, sides more nearly parallel; exuvia and posterior hinged portion each occupying one-fourth of total length of scale.

Adult Female.—Body usually twice as long as broad, broadest through preabdominal segments; brevaceratubæ numerous along lateral portion of preabdominal segments and along lateral margin of metathorax and caudal portion of lateral margin of mesothorax, extending mesad from margin as far as metaspines; mesothoracic spiracles 0-5, metaspines wanting; lateral margin of last three preabdominal segments with bractæ, fifth segment with two or occasionally with three, fourth and third with 2 to 5, those of the third usually not well developed.

Pygidium.—Lobes in two pairs, second pair deeply incised; median pair entire, rounded at distal end with slight indication of notch on each edge near proximal end, as broad as long; second pair of lobes with mesal lobelet distinctly longer and broader than lateral; each lobelet entire, rounded at distal end, lateral margins longer than mesal; plates arranged 2-2-2-2-2, those of third incisure longest and largest, those in incisura as long or longer than lobes, those of median incisura latipectinate, with teeth more numerous on mesal margin, median plate of second and third incisuræ unipectinate on lateral margin, median plate of second incisura occasionally appears to be latipectinate, lateral plate of second and third incisuræ swollen at proximal end, apparently never pectinate, plates of second incisura slightly smaller and shorter than those of median incisura, those of lateris never pectinate; genaceroles 3-6(6-11)4-9, mesogenaceroles arranged in a single row, pregenaceroles usually 7-8 and often in two rows, postgenaceroles usually 7-8 and generally arranged in a compact group more or less circular in outline rather than in rows; altaceratubæ arranged 1-2-2-1, a small ceratuba, one-half to three-fourths as large as altaceratubæ, cephalad of lobelets of second pair of lobes; brevaceratubæ arranged in three rows, those of third row usually consisting of four equidistant oraceratubæ, occasionally apparently arranged in two groups of two each, rarely only three in third row, cephalic one usually cephalad of caudal margin of pregenaceroles, two median mesad of postgenaceroles, fourth and fifth rows arranged in two groups, lateral group 1-2, mesal group 1-4, or 0-4 in fourth row; anus usually thirteen times its own width from distal end of lobes; vulva between postgenaceroles; incisuræ slight, median usually wider than width of a median lobe.

Host.—*Camellia japonica*; Mississippi; Big Point, June 29, 1917, (R. L. Eberhard); June 25, 1918, (J. C. Roberts); Laurel Hill, October 19, 1918, (J. S. McGhee); Magnolia, September 1, 1920, (Mrs. W. M. Lampton); Moss Point, December 27, 1918, (Mrs. G. B. Bowen); South Pascagoula, January 1921, (R. P. Barnhart, E. K. Bynum); Woodville, 1920, (J. C. Hamilton).

These insects apparently seek the protection of the under surface of the leaves, though frequently they are very numerous on the upper surface.

Lepidosaphes camelliae differs from *euryæ* in having the plates of the third incisuræ well developed, never smaller than the other plates and usually much longer and larger.

***Scobinaspis dentata* n. sp.** (Figs. 5, 6, 7, 8, 9).

Scale of Female.—Color dull white, with yellowish-green tinge, long, four to eight times as long as broad; second exuvia often occupying one-half of entire length of scale.

Scale of Male.—Similar to that of female, but shorter and broader in proportion.

Adult Female.—Body long, usually four times as long as broad, in living specimens portion of body caudad of rostrum almost cylindrical, ventral surface slightly flattened, portion of body cephalad of rostrum thinner, due to a deep concavity on ventral surface; single row of small tooth-like projections on the ventral surface between antennæ and cephalic margin of head, and a heavily chitinized thorn-like projection on each lateral margin between antenna and tentorium, rarely more than one; antennæ with two large setæ and a small one, large setæ sometimes branched; rostrum and rostralis dark; margin of pygidium dark; mesospiracerores 1-2; preabdominal segments and lateral portion of metathorax with numerous brevaceratubæ, lateral margins of preabdominal segments with bracteæ, segments five and four usually with two each, segment three with 3-4, and segment two with several small incompletely developed bracteæ.

Pygidium.—Lobes in two pairs, with second pair deeply incised; median lobes large, as broad as long, distal half subtriangular distal end bluntly rounded, margins slightly crenulate; second pair of lobes consisting of two distinct slender lobelets, mesal longer and wider, both lobelets together narrower than a median lobe, each lobelet with slight notch on lateral margin; plates arranged 2-1-1-1-1, apparently never pectinate; genacerores 2-4(6-8) 4-5; altaceratubæ arranged 1-2-2-1, very short and broad, almost as broad as long, opening in latadentes, those of second incisuræ largest; brevaceratubæ numerous, three large ones just cephalad of median and second incisuræ approximating size of altaceratubæ, laterals two or three times their own length from margin, median nearer margin, small brevaceratubæ apparently not arranged in distinct rows; anus usually not over eight times its own

width from distal end of lobes; vulva between postgenacerores; incisuræ slight, second almost as wide as median.

Host.—Maple (*Acer*), leaves; Vicksburg, Mississippi, April 1920, (Luther Brown); black haw (*Bumelia lanuginosa*), leaves, Cat Island, off gulfcoast, Mississippi, September 8, 1920, (R. P. Barnhart).

The scales are usually found along the sides of the veins or in the depressions at the forks of the veins, especially near the petiole of the leaf.

The striking differences between this scale and *Scobinaspis serrifrons* is the greater proportional length of the scale, which is white in contrast to the shorter reddish-brown scale of *serrifrons*; and the same difference in the length of the body which has only a few dentate projections on the ventral surface of the head and with no projections on the cephalic margin.

***Mytiella sexspina* n. sp.** (Figs. 10, 11, 12, 13).

Scale of Female.—Color brown, long, length usually more than four times breadth, straight or curved, according to crowded conditions of specimens, ventral scale white, very prominent along sides of scale but retracted a short distance within margin, adhering to dorsal scale when insect is removed from plant, if many eggs have been deposited, usually divided, otherwise generally intact on meson.

Scale of Male.—Similar to that of female, but only about one-half as long.

Adult Female.—Body usually three and one-half times as long as broad, with a distinct constriction between mesothorax and metathorax and between metathorax and abdomen; five distinct preabdominal segments; mesothorax, metathorax and first abdominal segment more heavily chitinized than remaining segments; coria of thorax and preabdomen distinct and not heavily chitinized; *brevaceratubæ* numerous, on lateral margins extend mesad on ventral aspect along *unacoria*; mesothoracic spiracerores 2-4, *metaspiracerores* wanting; cephalic end of each lateral margin of each of last three preabdominal segments with a small heavily chitinized thorn or tooth-like projection; fifth preabdominal segment with two bracteæ, occasionally three, fourth with two, and third with three or four short, stout ones, these latter may be wanting.

Pygidium.—Lobes in two pairs, second pair deeply incised, median pair of lobes rounded at distal end, mesal margin with two slight notches, lateral margin apparently always with a single notch, second pair of lobes with mesal lobelet about twice as wide as lateral lobelet and longer with slight notch on each side, lateral lobelet entire, rounded at distal end; plates arranged 2-2-2-2-2, plates of median incisuræ with short dentate projections on each side, usually located near middle of their length, plates of second incisuræ with similar short dentate pro-

jections on lateral margin only, median plate of third incisuræ with similar dentate projections, lateral plate without projections, plates of lateris without projections; genacerores 2-6 (4-9) 4-6; altaceratubæ arranged 1-2-2-1, at least three times as long as broad, brevaceratubæ not more than twice as long as broad, in three rows, those of third row consisting of one group of 3-5, fourth row divided into two groups, with three or four in lateral group and usually about six in mesal, fifth consisting of two widely separated groups of about three each; anus small, about eighteen times its own width from distal end of lobes, near a line drawn through lateral angles of fourth preabdominal segment; vulva always nearer anus than distal end of lobes, usually on a line drawn through caudal end of third row of brevaceratubæ; incisuræ slight, almost filled by plates, an incisura-like indentation cephalad of second pair of lobes; setæ arranged as shown in Figure.

Host.—Citrus, leaves and twigs; Logtown, Mississippi, August 22, 1916, (E. C. Lindsey); Satsuma oranges, Fort Pierce, Florida, January 7, 1920; (the writer); *Euonymus japonica*, leaves and twigs; Laurel, Mississippi, August, 1920, (H. L. Dozier, L. E. Miles, R. C. Price, J. V. Vernon); Yazoo City, Mississippi, February, 1921, (R. N. Lobdell, G. D. Dorroh).

Mytiella sexspina differs from *carinata* in having a thorn-like projection on the cephalic end of each lateral margin of the last three preabdominal segments and in having two well developed plates in each second incisura.

EXPLANATION OF PLATE XXIX.

Lepidosaphes pinnaeformis Bouche.

1. Altaceratuba with oraceratuba open.

Lepidosaphes camelliæ n. sp.

2. Body of adult female.
3. Pygidium of adult female.
4. Sinistral plate of median incisura.

Scobinaspis dentata n. sp.

5. Body of adult female.
6. Pygidium of adult female.
7. Ventral aspect of cephalic portion of head, with dentate projections.
8. Large brevaceratuba with oraceratuba closed.
9. Ceratuba and paraceratuba from lateral portion of first preabdominal segment.

Mytiella sexspina n. sp.

10. Body of adult female.
11. Ceratubæ from lateral edge of second preabdominal segment.
- 12a. Mesal plate of third incisura.
- 12b. Mesal plate of second incisura.
- 12c. Sinistral plate of median incisura.
13. Pygidium of adult female.